Space Weather Forecast

Issued on Monday, 09 October 2023 at 13:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of isolated M-class flares. Slight chance G1 Minor Storm day 1-3 (09-11 Oct) from arrival of fast solar winds. Chance G1-G2 Minor/Moderate storm intervals day 3-4 (11-12 Oct) due to CME arrival.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with the strongest flare only at common class levels, peaking at 09/1143 UTC. This was from a sunspot in the northwest of the disc. There are nine sunspot regions visible. The region in the northwest is the largest and most magnetically complex, with a couple of moderately sized spots, including one of mixed polarity. A further smaller region in the in the southeast is slowly developing and is the next most complex area. It has seen the emergence of a number of small, mixed polarity spots. The remaining regions are all smaller and simpler. No new Earth-directed coronal mass ejections (CMEs) have been detected.

Solar Wind / Geomagnetic Activity: Solar winds have generally persisted at background speeds of 300-340 km/s, but a recent increase in solar wind speeds to around 350km/s may be indicative of the early stages of a connection to a coronal hole high-speed stream. Total interplanetary magnetic field (IMF) strength, has been weak. The north-south component has been weak and largely negative (southward). Geomagnetic activity has been Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels, with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with isolated Moderate flares likely. There is a slight chance of very isolated Strong flare, most likely from the large sunspot in the northwest.

Solar Wind / Geomagnetic Activity: There is one Earth-directed CME, with expected arrival either late day 3 or early day 4 (11-12 Oct). Otherwise current slow wind conditions are expected to give way to a transition into the fast winds from small coronal hole during day 1 into day 2 (09-10 Oct) and then from the larger, more prominent coronal hole later day 2 or day 3 (10-11 Oct). This will likely bring peak winds of around 500-600 km/s. Quiet geomagnetic activity will increase to Unsettled to Active on day 1 or day 2 (09-10 Oct) ahead of the fast wind enhancements, before easing again. Later day 3 or early day 4 (11-12 Oct), activity will likely become Active with a chance of G1-G2 Minor/Moderate storms intervals due to any CME arrival.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to remain at background levels, but with a slight chance of enhancements from the current sunspots on the disc, most likely the region in the northwest.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	20	30	30
Strong	G3	No	1	1	5	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	55	50
Very Active	R3 to R5 X	No	10	10	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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